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HOMOPTERA

FAM. ALEYRODIDÆ

by A. L. QUAINTANCE

1908

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On souscrit chez M. P. Wytsman, Zoologiste, 43, rue Saint-Alphonse, à Bruxelles
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HOMOPTERA

FAM. ALEYRODIDÆ

by A. L. QUAINTANCE

WITH 2 COLOURED PLATES

THE *Aleyrodidæ* occupy a systematic position between the Aphididæ and Coccidæ, and in the immature stages are at times mistaken for members of these families, and of the *Psyllidæ*. Upon careful examination, however, characteristic structures will be found, by which the members of the *Aleyrodidæ* may be positively identified. While the bibliography of this family is fairly extensive, the earlier writings are of comparatively little importance from a systematic standpoint. Prior to Latreille, the insects were referred by writers to such genera as *Tinea*, *Phælena*, *Chermes*, etc. The genus *Aleyrodes* was established by Latreille (1) and was placed with the *Aphididæ*, to which family it was subsequently referred and to the *Coccidæ* by various writers until 1840.

Westwood (2), in 1840, in reviewing the genus established the family *Aleyrodidæ*, the then single genus *Aleyrodes* constituting the type genus. Signoret (3) gave the first comprehensive revision of the family in 1867, in his *Essai monographique sur les Aleurodes*, in which 23 species were treated, six being described as new. This valuable paper has constituted the principal basis for subsequent workers.

In 1892, the genus *Aleurodicus* was erected by Douglas (4) for a species from Demerara, described as *anonæ*, by Morgan, who also transferred to the new genus the *Aleyrodes coccois* of Curtis, also from Demerara. Maskell (5) in 1896, catalogued the species of the world, giving descriptions of 22 new forms, bringing the number up to 66, four belonging to *Aleurodicus*. The American species were treated by the writer (6) in 1900, 52 being listed, 18 of which were described as new. In 1902,

(1) Mag. Encycl. Vol. 2, p. 304 (1795); Précis des Caractères des Insectes, p. 93 (1796); Gen. Crust. et Ins. Vol. 3, p. 173 (1807).
(2) Modern Classification of Insects, Vol. 2, p. 442 (1840).
(3) Essai Monographique sur les Aleurodes, Ann. Soc. Ent. Fr. (4), Vol. 8, p. 369-402 (1867).
(4) Ent. Mo. Mag. (2), Vol. 3, p. 29-33 (1892).
(5) Contributions toward a monograph of the *Aleurodidae* (Trans. New Zealand Institute, Vol. 28, p. 411-449 (1895).
(6) Contributions toward a monograph of the American *Aleurodidae* (Bull. 8, Tech. Ser. Div. Ent. U. S. Dept. Agri. Washington, p. 9-48 (1900).

Cockerell (1) catalogued the species of the world according to their geographical distribution, and proposed subgenera *Dialeurodicus* for *Aleurodicus*, with *A. cockerelli*, Quaintance as type; and for *Aleyrodes*, subgenera *Asterochiton*, *Dialeurodes*, *Trialeurodes* and *Tetraleurodes*, with *Aleyrodes aureus*, Maskell; *A. citri*, Riley and Howard; *A. pergandei*, Quaintance; and *A. perileuca*, Cockerell as types respectively. A valuable paper by Peal (2) was published in 1903 on the known Oriental species of the family in which 16 forms are listed for that region, seven being described as new. The Aleyrodids of California were treated in 1904 by Florence E. Bemis (3), with references to other American species. In the paper cited, 23 species are recorded for the State, 19 of which were described as new.

In 1907, a catalogue of the species of the world, by G. W. Kirkaldy, was published, with descriptions of six new species by Jacob Kotinsky (4). Also in 1907, Albert Tullgren established a new genus, *Aleurochiton*, with *Aleyrodes aceris* Geoffroy as type, presenting also detailed descriptions of *Aleyrodes proletella* Linné; *A. brassicae*, Walker; *A. fragariae*, Walker and *Aleurochiton aceris*, Geoffroy (5).

The specific characters in *Aleyrodes* are determined mainly from the so-called « pupa case », the adults in this genus being remarkably similar in structure and coloration except those species with spotted or banded wings. In *Aleurodicus*, the adults are likely to vary more but in this genus also the pupa case offers good diagnostic characters. In characterizing species of this family, descriptions should be made of as many stages as possible, as the egg, pupa case, and adults. Certain species may be separated with certainty only after a comparison of all these stages. Many descriptions, especially of the older writers, are too incomplete to permit of the positive identification of their species.

To any one who has given even casual attention to this family, it will at once be evident that the present list of species for the world represents but a small fraction of those which exist. It is hoped that entomologists, especially those in tropical and sub-tropical parts of the world will interest themselves in this very interesting family.

Directions for collecting. — In collecting specimens of *Aleyrodidae*, special attention should be given to securing adult as well as immature stages. If leaves infested with pupæ be placed in suitable jars for a few days, adults may often thus be secured. Frequently adults may be found in abundance on the more tender growth of plants infested by the immature stages. After necessary live notes as to color, etc., have been made, abundant specimens should be preserved in thin xylol balsam mounts on slides. It is often necessary to boil in KOH3 the darker larvæ and pupa cases, before mounting, to render their structure discernible, as in the case of coccids. Leaves infested with immature stages also should be preserved in a way to keep intact the waxy secretion, often of much importance in making preliminary determinations. Adults may be preserved dry in suitable vials and held in place with bits of cotton, or mounted on « points » as is done in the case of various minute insects.

Economic species. — But few species of this family rank as serious pests, but the injuries of some are quite important. *Aleyrodes citri*, Riley and Howard, is perhaps the principal pest of the orange at the present time in Florida, and has been lately introduced into California. This species has been well treated by Riley and Howard (6) and by H. A. Gossard (7). *Aleyrodes bergii*, Signoret, *A. lacteae*, Zehntner and *A. longicornis*, Zehntner are all destructive to sugar cane in Java, and have been carefully

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1 The Classification of the *Aleurodidae* (Proc. Acad. Nat. Sc. Philad. Vol. 54, p. 279-283 (1902).

2) Contributions toward a Monograph of the oriental *Aleurodidae* (Journ. Asiat. Soc. Bengal, Vol. 62, p. 61-98 (1903).

(3) The Aleyrodids or mealy-winged flies of California (Proc. U. S. Nat. Mus. Vol. 27, p. 471-537 (1904).

(4) A catalogue of the Hemipterous family *Aleyrodidae* and *Aleyrodidae* of Hawaii (Bull. 2, Div. of Ent. Board of Com. of Agric. and Forestry of Territory of Hawaii (1907).

(5) Ueber einige Arten der Familie *Aleurodidae*, Arkiv. för Zoologi, Stockholm, Bd. 3, N° 26 (1907).

(6) Insect Life, Vol. 5, p. 219-226 (1893).

(7) Bull. 67, Florida Agric. Exper. Station (1903).

studied by Dr. L. Zehntner (1). *Aleyrodes tabaci*, Gennadios, a pest of tobacco in Greece, has been well treated by Targioni-Tozzetti (2). *Aleyrodes vaporariorum*, Westwood, is quite destructive to vegetables and flowers grown under glass and to a less extent out-of doors in the United States, and possibly elsewhere. This insect has been thoroughly treated by Morrill (3) who has also treated a related species, *A. packardi*, Morrill, which is injurious to strawberries. *Aleurodicus cocois*, Curtis, infesting the cocoanut, guava, etc., is the subject of an article by Riley and Howard in Insect Life (4).

FAM. ALEYRODIDÆ, WESTWOOD

Aleyrodidæ. Latreille, Mag. Encycl. Vol. 2, p. 304 (1795); Précis Caractères Insectes, p. 93 (1796); Genera Crustac. et Insect. Vol. 3, p. 174 (1807); Westwood, Mod. Class. of Ins. Vol. 2, p. 442 (1840); Signoret, Ann. Soc. Ent. Fr. (4), Vol. 8, p. 369-402 (1867); Maskell, Trans. New Zealand Inst. Vol. 22, p. 170-176 (1889); Morgan, Ent. M. Mag. (2) Vol. 3, p. 29-33 (1892); Maskell, Trans. New Zealand Inst. Vol. 28, p. 411-449 (1895); Quaintance, Bull. 8, Tech. Ser. Div. Ent. U. S. Dept. Agr. Wash. (1900); Cockerell, Proc. Acad. Nat. Sc. Philad. Vol. 54, p. 279-283 (1902); Peal, Journ. Asiat. Soc. Bengal, Vol. 72, N. S. p. 61-98 (1903); Bemis, Proc. U. S. Nat. Mus. Vol. 27, p. 471-537 (1904); Tullgren, Arkiv f. Zool. Stockholm, Bd. 3, Nr. 26, p. 1-18 (1907); Kirkaldy & Kotinsky, Bul. 2, Div. Ent. Board Com. Agric. and Forestry Territory Hawaii, p. 1-101 (1907).

Characters. — Small to minute insects, infesting plants, the immature stages scale like, the adults of both sexes winged, active, powdered with white.

In adults, head small, convex above, rounded anteriorly; eyes reniform, « dumb-bell » shape, or completely divided; a single ocellus above each eye. Antennae 7-jointed, basal joint short and cup-shaped; second larger, globose or subpyriform; joints 3 to 7 slender and numerously ringed, joint 3 longest. Rostrum of a single segment. Mentum long, free, 3-jointed, inclosing the rostral setae. Thoracic segments about equally distinct, the prothorax smallest. Each sex with two pairs of wings, rounded distally, and serrate or « beaded » all around, each serrulation with a few minute hairs. Wings with but a single median vein; a single basal branch in fore wing in *Aleyrodes*, a basal and distal branch in fore and hind wings in *Aleurodicus*, and in *Aleurochiton* there is a basal and a distal branch in fore wings, the vein of the hind wing being unbranched. Legs long, slender, with dimerous tarsi, ending in 2 claws, and a central process. Abdomen somewhat pedunculate, especially in males, roundly tapering or ovoid, in females ending in conical ovipositor. In male abdomen more slender, ending in forcipate genitalia, composed of two valves, and the central, curved, penis. On dorsum of last abdominal segment of each sex, is the so-called « vasiform orifice, » comprising the orifice, the operculum, and the lingula. General color of body yellow, often with dusky markings, but all more or less obscured with the powdery dusting of white wax.

Immature stages elliptical, oval or rounded in shape, quiescent except in first larval, occurring mostly on lower, less usually on upper surface of leaves, to which they are attached by sucking mouth-

(1) Archief Java Suikerindustrie, 14, p. 939 (1896); Vol. 7, p. 445 and 450
(2) Animali ed Ensetti del Tabacco, p. 246 (1891).
(3) Bull. 1, Tech. Ser. Massachussets Agric. Exper. Station (1903).
(4) Insect Life, Vol. 5, p. 314 (1893).

parts. In earlier stages, mostly flat, in pupating becoming more convex or in some species raised on a beautiful palisade all around of white wax. Pupa case usually with spines or hairs though some of these are often obscure. There is usually more or less of waxy secretion from a marginal rim of wax tubes and often also from dorsum of case, in the shape of rods, or asbestiform, powdery, wooly or flocculent wax, usually of characteristic pattern. and sometimes so copious as to cover the insect. A distinctly Aleyrodid character in the larval and pupal stages is the presence on the dorsum of last abdominal segment of a rounded, ovoid or semielliptical opening. the « vasiform orifice », consisting, as stated for the adult, of the orifice, operculum, and lingula. This is the excretory opening, and from the lingula a sweetish fluid is voided. These structures vary much with different species and consequently furnish valuable diagnostic characters.

Eggs are ellipsoidal, often curved, or flattened on one side, attached firmly to leaf with a short stalk; surface either smooth, or showing minute polygonal markings.

SYNOPSIS OF GENERA

Vein of fore wing with single basal branch; hind wing with single vein. 1. Genus ALEYRODES, Latreille.
Vein of fore wing with basal and distal branches; hind wing with single vein . . . . . 2. Genus ALEUROCHITON, Tullgren.
Vein of fore and hind wings each with basal and distal branches . . 3. Genus ALEURODICUS, Douglas.

1. GENUS ALEYRODES, LATREILLE (1)

Aleyrodes. Latreille (1795).
Type species : **A. proletella.** Linné = **A. chelidonii.** Latreille.
Subgenera : **Asterochiton.** Cockerell, type **A. aureus.** Maskell.
Dialeurodes. Cockerell, type **A. citri.** Riley & Howard.
Trialeurodes. Cockerell, type **A. pergandei.** Quaintance.
Tetraleurodes. Cockerell, type **A. perileuca.** Cockerell.

Characters. — Adults with but a single branch to vein of fore wing, arising at very, base, or often apparently distinct. Hind wings with but a single vein.. Pupa case without compound pores, and lingula usually not prominently protruding from vasiform vein orifice as in *Aleurodicus*.

Geographical distribution of species. — The genus *Aleyrodes* is cosmopolitan, and a few species are becoming widely distributed. transported no doubt from one country to another on their food plants, as in the case of species of *Coccidæ*. Conditions are much less favorable for their dissemination, however, since Aleyrodids infest exclusively the leaves of plants which in most cases are largely, if not entirely, removed before shipment. *Aleyrodes vaporariorum*, Westwood occurs rather generally over Europe and America, and is recorded from Hawaii; *A. citri*, abundant in the Southern United States, occurs also in California, Cuba, Mexico. Brazil, China and possibly Chile. Careful investigation would probably show that some of the species infesting economic plants are much more widely distributed than is at present known to be the case.

The great majority of species are yet known only from the country from whence described, though in some instances they have evidently been there introduced, their nativity, however, being at

(1) Greek, *aleuron*, floury or mealy. The name of the genus, originally spelled by Latreille *Aleyrodes*, was later spelled *Aleurodes*, following apparently a note by Burmeister (Handb. Ent. Vol. 2, p. 82, 1835, « Latreille's Orthographie *Aleyrodes* muss in *Aleurodes* verwandelt werden », who, however, presented no reason for this change, and which seems to have been unwarranted. Also, writers on this genus have not been agreed as to the gender of *Aleyrodes* and there is consequently lack of uniformity in case ending of specific names. In this list, the original orthography is preserved.

present unknown. Including native and introduced species, the number recorded from the several regions is as follows : Australasian region, 21; Aethiopian region, 2; Oriental region, 15; Palaeartic region, 32; Neartic region, 53; Neotropical region, 13; Unattached region, 5.

One fossil species is known : *A. aculeatus*, from Prussian amber, Ligurian Horizon.

1. *A. abnormis*, Quaintance, Bull. 8, Tech. Ser. Div. Ent. U. S. Dept. Agric. Wash. p. 17 (1900) (Florida).
2. *A. abutilonea*, Haldeman, Amer. Journ. Sc. and Arts, Vol. 9, p. 108 (1850) (Eastern United States : Pennsylvania to Florida). — **Pl. I, Fig. 4, 5, 5a, 5b, 5c; Pl. 2, Fig. 6.**
   syn. fitchi, Quaintance.
3. *A. acaciae*, Quaintance, Bull. 8, Tech. Ser. Div. Ent. U. S. Dept. Agric. Wash. p. 19 (1900) (California, Mexico).
4. *A. acteae*, Britton, Ent. News, Philad. Vol. 16, p. 5 (1905) (Connecticut).
5. *A. aëpim*, Goeldi, Mittheil. Schweiz. Ent. Ges. Vol. 7, p. 250 (1886) (Brazil : Rio de Janeiro).
6. *A. alcocki*, Peal, Journ. Asiat. Soc. Bengal, Vol. 72, p. 74 (1903) (India).
7. *A. amnicola*, Bemis, Proc. U. S. Nat. Mus. Vol. 27, p. 514 (1904) (California).
8. *A. asparagi*, Lewis, Journ. Quekett Microsc. Club, Vol. 6 (2), p. 88 (1895) (Natal).
9. *A. asplenii*, Maskell, Trans. New Zealand Inst. Vol. 22, p. 173 (1889) (New Zealand).
10. *A.* (*Asterochiton*) *aureus*, Maskell, ibidem, Vol. 22, p. 174 (1889); ibidem, Vol. 2, p. 215 (1879) (New Zealand).
    syn. melicyti, Maskell.
11. *A. aurantii*, Maskell, ibidem, Vol. 28, p. 431 (1895) (India).
12. *A. aureocincta*, Cockerell, Journ. New York Ent. Soc. Vol. 5, p. 42 (1897) (New Mexico).
13. *A. avellanae*, Signoret, Ann. Soc. Ent. Fr. (4), Vol. 8, p. 385 (1867) (France).
14. *A. bambusae*, Peal, Journ. Asiat. Soc. Bengal, Vol. 72, p. 85 (1903) (India).
15. *A. banksiae*, Maskell, Trans. New Zealand Inst. Vol. 28, p. 423 (1895) (Australia).
16. *A. barodensis*, Maskell, ibidem, Vol. 28, p. 424 (1895) (India).
17. *A. bengalensis*, Peal, Journ. Asiat. Soc. Bengal, Vol. 72, p. 70 (1903) (India).
18. *A. berbericola*, Cockerell, Journ. New York Ent. Soc. Vol. 4, p. 207 (1896) (New Mexico).
19. *A. bergii*, Signoret, Ann. Soc. Ent. Fr. (4), Vol. 8, p. 395 (1867) (Isle of Maurice, Java, Fiji, Levuka, Rena).
20. *A. brassicae*, Walker, Cat. Homopt. Brit. Mus. p. 1092 (1852) (Europe).
21. *A. calophylli*, Kotinsky, Bull. 2, Div. Ent. Board Com. Agric. and Forestry Hawaii, p. 98 (1907) (Fiji).
22. *A. capreae*, Signoret, Ann. Soc. Ent. Fr. (4), Vol. 8, p. 384 (1867) (France).
23. *A. carpini*, Koch, Die Pflanzenlause Aphiden, p. 327 (1857) (Europe).
24. *A. cerata*, Maskell, Trans. New Zealand Inst. Vol. 28, p. 425 (1895) (New Zealand).
25. *A. citri*, Riley & Howard, Insect Life, Vol. 5, p. 219 (1893) (United States : Florida, Georgia, Alabama, Louisiana, Texas, California; Cuba, Chile (?), China). — **Pl. I, Fig. 2, 3a, 3b, 3c.**
26. *A. cockerelli*, Ihering, Rev. Museu Paulista, N. 2, p. 393 (1897) (Brazil).
27. *A. comata*, Maskell, Trans. New Zealand Inst., Vol. 28, p. 426 (1895) (Fiji).
28. *A. (Lecanium) complanatum* (Bärensprung) D'Alton & Burmeister, Zeit. f. Zool. Vol. 1, p. 169 (1849); Spec. Bull. 88, Massachussets Agric. Exper. Station, p. 330 (1903) (Germany).
29. *A. corni*, Haldeman, Amer. Journ. Sc. and Arts, Vol. 9, p. 109 (1850) (Pennsylvania).
30. *A. coronata*, Quaintance, Bull. 8, Tech. Ser. Div. Ent. U. S. Dept. Agric. Wash., p. 22 (1900) (California).
31. *A. coryli*, Britton, Ent. News, Philad. Vol. 18, p. 337 (1907) (Connecticut).
32. *A. cotesii*, Maskell, Trans. New Zealand Inst. Vol. 28, p. 427 (1895) (Baluchistan).
33. *A. croceata*, Maskell, ibidem, Vol. 28, p. 428 (1895) (Australia).
34. *A. decipiens*, Maskell, ibidem, p. 428 (1895) (Australia).
35. *A. diasemus*, Bemis, Proc. U. S. Nat. Mus. Vol. 27, p. 516 (1904) (California).
36. *A. dorseyi*, Kirkaldy (*A. quaintancei*, Bemis) Proc. U. S. Nat. Mus. Vol. 27, p. 520 (1904) (California).
37. *A. dubia*, Heeger, Beitr. Naturg. Ins. p. 223 (1858) (Austria, Germany).
38. *A. erigerontis*, Maskell, Trans. New Zealand Inst. Vol. 28, p. 429 (1895) (Mexico).

39. *A. errans*, Bemis, Proc. U. S. Nat. Mus. Vol. 27, p. 500 (1904) (California).
40. *A. eugeniae*, Maskell, Trans. New Zealand Inst. Vol. 28, p. 430 (1895) (India).
41. *A. euphorbiae*, Loew, Vehr. Zool.-bot. Ges. Wien, Vol. 17, p. 746 (1867) (Austria).
42. *A. extraniens*, Bemis, Proc. U. S. Nat. Mus. Vol. 27, p. 526 (1904) (New Zealand).
43. *A. fagi*, Maskell, Trans. New Zealand Inst. Vol. 22, p. 175 (1889) (New Zealand).
44. *A. fernaldi*, Morrill, Psyche, Vol. 10, p. 83 (1903) (Massachusetts, Connecticut).
45. *A. fijiensis*, Kotinsky, Bull. 2, Div. Ent. Board Com. Agric. and Forestry, Hawaii, p. 100 (1907) (Fiji).
46. *A. filicium*, Goeldi, Mittheil. Schweiz. Ent. Ges. Vol. 7, p. 248 (1886) (Brazil : Rio de Janeiro; Kew Gardens).
47. *A. floccosa*, Maskell, Trans. New Zealand Inst. Vol. 28, p. 432 (1895) (Jamaica, Mexico).
48. *A. floridensis*, Quaintance, Bull. 8, Tech. Ser., Div. Ent. U. S. Dept. Agric. Wash. p. 26 (1900) (Florida).
49. *A. fodiens*, Maskell, Trans. New Zealand Inst. Vol. 28, p. 433 (1895) (New Zealand).
50. *A. forbesii*, Ashmead, Fourteenth Rept. Illinois State Entomol. p. 110 (1884); Also Monogr. N. Amer. Proctotrypidæ, Bull. 45, U. S. Nat. Mus. p. 294 (Eastern United States).
    syn. A. aceris, Forbes.
51. *A. fragariae*, Walker, List. Homopt. Brit. Mus. p. 1092 (1851); Also Ann. Soc. Ent. Fr. (4), Vol. 8, p. 383 (1867) (England, France).
52. *A. fraxini*, Signoret, Ann. Soc. Ent. Fr. (4), Vol. 8, p. 386 (1867) (France).
53. *A. fumipennis*, Hempel, Psyche, Vol 8, p. 394 (1899) (Brazil).
54. *A. gelatinosus*, Cockerell, The Canad. Entom. Vol. 30, p. 264 (1898) (New Mexico, California).
55. *A. giffardi*, Kotinsky, Bull. 2, Div. Ent. Board. Com. Agric and Forestry, Hawaii, p. 94 (1907) (Hawaii).
56. *A. glacialis*, Bemis, Proc. U. S. Nat. Mus. Vol. 27, p. 518 (California).
57. *A. (Aspidiotus) gossypii*, Fitch, Third Rep. Nox. and other Ins. New York, p. 332 (1857) (China : Ningpo).
58. *A. goyabae*, Goeldi, Mittheil. Schweiz. Ent. Ges. Vol. 7, p. 248 (1886) (Brazil : Rio de Janeiro).
59. *A. graminicola*, Quaintance, The Canad. Entom. Vol 31, p. 89 (1899) (Florida).
60. *A. hibisci*, Kotinsky, Bull. 2, Div. Ent. Board. Com. Agric. and Forestry Hawaii, p. 96 (1907) (Hawaii).
61. *A. hirsuta*, Maskell, Trans. New Zealand Inst. Vol. 28, p. 434 (1895) (Australia).
62. *A. horridus*, Hempel, Psyche, Vol. 8, p. 394 (1899) (Brazil).
63. *A. howardi*, Quaintance, Bull. 12, Tech. Ser. Bur. Ent. U. S. Dept. Agric. Wash. p. 91 (1907) (Cuba).
64. *A. hutchingsi*, Bemis, Proc. U. S. Nat. Mus. Vol. 27, p. 532 (1904) (California).
65. *A. hoyae*, Peal, Journ. Asiat. Soc. Bengal, Vol. 72, p. 88 (1903) (India).
66. *A. immaculata*, Heeger, Beitr. Naturg. Ins. p. 1 (1855) (Europe).
67. *A. inconspicua*, Quaintance, Bull. 8, Tech. Ser. Div. Ent. U. S. Dept. Agric Wash. p. 29 (1900) (Florida).
68. *A. interrogationis*, Bemis, Proc. U S. Nat. Mus. Vol. 27, p. 510 (1904) (California).
69. *A. iridescens*, Bemis, ibidem, Vol. 27, p. 487 (1904) (California).
70. *A. jelinekii*, Frauenfeld, Verh. Zool.-bot. Ges. Wien, p. 799 (1867) (France, Austria).
71. *A. kelloggi*, Bemis, Proc. U. S. Nat. Mus. Vol. 27, p. 499 (1904) (California).
72. *A. kirkaldyi*, Kotinsky, Bull. 2, Div. Ent. Board. Com. Agric. and Forestry, Hawaii p. 95 (1907) (Hawaii).
73. *A. lacerdae*, Signoret, Ann. Soc. Ent. Fr. Pt. 2, p. 72 (1883) (France).
74. *A. lactea*, Zehntner, Mededeeleng Proefstat. Oost-Java, n. s. 37, p. 34 (1897), also Arch. Java Suiker-ind., Vol. 7, p. 459 (1897) (Java).
75. *A. lauri*, Signoret, Ann. Soc. Ent. Fr. Pt. 2, p. 158 (1881) (Greece).
76. *A. (Asterochiton) lecanioides*, Maskell, Trans. New Zealand Inst. Vol. 22, p. 173 and 176 (1889); ibidem, Vol. 11, p. 215 (1878) (New-Zealand).
    syn. papillifer, Maskell.
77. *A. leakii*, Peal, Journ. Asiat. Soc. Bengal, Vol. 72, p. 87 (1903) (India, Fiji).
78. *A. limbata*, Maskell, Trans. New Zealand Inst. Vol. 28, p. 436 (1895) (Australia).
79. *A. lonicerae*, Walker, Cat. Homopt. Brit. Mus. p. 1092 (1852) (Europe).
80. *A. longicornis*, Zehntner, Arch. Java Suiker Ind, Vol. 5, p. 381 (1897) (Java).

81. *A. madroni*, Bemis, Proc. U. S. Nat. Mus. Vol. 27, p. 507 (1904) (California).
82. *A. marlatti*, Quaintance, The Canad. Entom. Vol. 34, p. 61 (1902) (Japan).
83. *A. maskelli*, Bemis, Proc. U. S. Nat. Mus. Vol. 27, p. 524 (1904) (California).
84. *A. melanops*, Cockerell, Bull. Florida Exper. Station, No. 67, p. 665 (1903) (California).
85. *A. merlini*, Bemis. Proc. U. S. Nat. Mus. Vol. 27. p. 512 (1904) (California).
86. *A. mori*, Quaintance. The Canad. Entom. Vol. 31, p. 1 (1899) (Eastern United States). — **Pl. 1, Fig. 1, 1a, 1b.**
    a) *mori arizonensis*, Cockerell, Science Gossip, Vol. 6 n. s. p. 366 (1900) (Arizona).
    b) *mori maculata*, Morrill, Psyche, Vol. 10, p. 81 (1903) (Massachussetts).
87. *A. morrilli*, Britton, Ent. News Philad. Vol. 18. p. 340 (1907) (Connecticut).
88. *A. nephrolepidis*, Quaintance, Bull. 8, Tech. Ser. Div. Ent. U. S. Dept. Agric. Wash. p. 29 (1900) (Pennsylvania in conservatory).
89. *A. nicotianae*, Maskell, Trans. New Zealand Inst. Vol. 28, p. 436 (1895) (Mexico).
90. *A. niger*, Maskell, ibidem, Vol. 28 p. 437 (1895) (Australia).
91. *A. nigrans*, Bemis. Proc. U. S. Nat. Mus. Vol 27, p. 522 (1904) (California).
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94. *A. parvus*, Hempel, Psyche, Vol. 8, p. 395 (1899) (Brazil).
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117. *A. sonchi*, Kotinsky, Bull. 2, Div. Ent. Board. Com. Agric. and Forestry, Hawaii, p. 97 (1907) (Hawaii).
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126. *A. tabaci*, Gennadios, Agricolt. Ellenica (Gennaio) (1889); also Targioni-Tozetti, Animali ed Ensetti del Tobacco, p. 246 (1892) (Greece).
127. *A. tentaculatus*, Bemis, Proc. U. S. Nat. Mus. Vol. 27, p. 494 (1904) (California).
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131. *A. vaccinii*, Künow, Ent. Nachr. Vol. 6, p. 48 (1880) (Germany).
132. *A. vaporariorum*, Westwood, The Gardener's Chronicle, p. 852 (1856). (Thought to be native of Brazil; now quite generally distributed in Europe and America, occurring mostly in conservatories; also in Hawaii).
133. *A. variabilis*, Quaintance, Bull. 8, Tech. Ser. Div. Ent. U. S. Dept. Agric. Wash. p. 39 (1900) (Florida).
134. *A. vinsonioides*, Cockerell, Psyche, Vol. 8, p. 225 (1898) (Mexico).
135. *A. vitrinellus*, Cockerell, Ent. News, Philad. Vol. 14, p. 241 (1903) (Mexico).
136. *A. vittata*, Quaintance, Bull. 8, Tech. Ser. Div. Ent. U. S. Dept. Agric. Wash. p. 42 (1900) (California).
137. *A. voeltzkowi*, Newstead, Quarterly Journ. Liverpool, Vol. 3, p. 12 (1908) (Madagascar).
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2. Genus ALEUROCHITON, Tullgren

Aleurochiton. Tullgren, Arkiv f. Zool. Stockh. Bd. 3, N. 26, p. 14 (1907).
Chermes aceris ovatus. Geoffroy, Hist. des Insectes, Vol. 1, p. 509 (1762).
Aleyrodes aceris. Bärensprung, D'Alton & Burmeister, Zeit. f. Zool. Vol. 1, p. 176 (1849).

Type : *A. aceris*, Geoffroy.

Characters. — Vein of fore wing, with a basal and distal branch; in hind wing, vein not branched. Genus intermediate between *Aleyrodes* and *Aleurodicus*.

Geographical distribution of species. — Only one species from Europe.

1. *A.* (*Aleyrodes*) *aceris*, Geoffroy, Tullgren, Arkiv f. Zool., Stockh., Bd. 3, N. 26, p. 14 (1907) (Europe). — **Pl. 2, Fig. 9, 9a, 9b, 9c, 9d.**

3. Genus ALEURODICUS, Douglas

Aleurodicus. Douglas, Ent. M. Mag. (2), Vol. 3, p. 32 (1892).

Type : *A. anonae*, Morgan.

Subgenus : **Dialeurodicus**, Cockerell.
Type : *A. cockerelli*, Quaintance.

Characters. — With a basal and distal branch to vein in both fore and hind wings. Pupa-case with compound pores on dorsum; lingula large, protuding.

Geographical distribution of species. — With the exception of *A. holmesii*, which occurs in Fiji, and probably there introduced on its food plant *Psidium*, from the West Indies, species of *Aleuro-*

dicus are thus far known only from the warmer parts of America (Florida, West Indies, Mexico, Brazil, etc.). *A. asarumis,* from northern United States, (Illinois) and referred to this genus by Riley and Howard, will when rediscovered doubtless prove to be an *Aleyrodes,* as originally described by Shimer.

1. *A.* (*Aleyrodes*) *altissima,* Quaintance, Bull. 8, Tech. Ser. Div. Ent. U. S. Dept. Agric. Wash. p. 20 (1900) (Mexico).
2. *A. anonae,* Morgan, Ent. M. Mag. (2) Vol. 3, p. 34 (1892) (Demerara, Brazil, British Guiana. Trinidad, Martinique, Florida).
3. *A.* (*Aleyrodes*) *asarumis,* Shimer, Trans. Amer. Ent. Soc. Vol. 1, p. 281 (1867) (Illinois).
4. *A. cockerelli,* Quaintance, Bull. 8, Tech. Ser. Div. Ent. U. S. Dept. Agric. Wash. p. 45 (1900); Ann. Mag. Nat. Hist. (7). Vol. 8, p. 387 (1901) (Brazil).
5. *A. cocois,* Curtis, The Gardener's Chronicle, p. 284 (1846) (Barbados, British Honduras, British Guiana, Trinidad, Venezuela, Brazil). — **Pl. 2, Fig. 10, 11a-i.**
6. *A. dugesii,* Cockerell, The Canad. Entom. Vol. 28, p. 302 (1896) (Mexico).
7. *A.* (*Aleyrodes*) *holmesii,* Maskell. Trans. New Zealand Inst. Vol. 28, p. 435 (1895) (Fiji).
8. *A. iridescens,* Cockerell, Psyche, Vol. 8, p. 226 (1898) Mexico).
9. *A. jamaicensis,* Cockerell, Proc. Acad. Natur. Sc. Philad. Vol. 54, p. 280 (1902) (Jamaica).
10. *A. minima,* Quaintance, Bull. 8, Tech. Ser. Div. Ent. U. S. Dept. Agric. Wash. p. 47 (1900) (Puerto Rico).
11. *A. mirabilis,* Cockerell, Psyche, Vol. 8, p. 225 (1898); ibidem, p. 360 (1899) (Mexico).
12. *A. ornatus,* Cockerell, Ent. M. Mag. (2), p. 105 (1893) (Jamaica).
13. *A.* (*Aleyrodes*) *perseae,* Quaintance, Bull. 8, Tech. Ser. Div. U. S. Dept. Agric. Wash. p. 32 (1900) (Florida).
14. *A.* (*Aleyrodes*) *pulvinata,* Maskell, Trans. New Zealand Inst. Vol. 28, p. 439 (1895) (Trinidad).

INDEX

	Pages.
abnormis, Quaint. (*g. Aleyrodes*)	5
abutilonea, Hald. (*g. Aleyrodes*)	5
acaciae, Quaint. (*g. Aleyrodes*)	5
aceris, Geoff. (*g. Aleurochiton*)	5
acteae, Britt. (*g. Aleyrodes*)	3
aëpim, Goeldi (*g. Aleyrodes*)	5
alcocki, Peal (*g. Aleyrodes*)	5
Aleurochiton (genus), Tullgr.	8
Aleurodicus (genus), Dougl.	8
Aleyrodes (genus), Latr.	4
altissima, Quaint. (*g. Aleurodicus*)	9
amnicola, Bem. (*g. Aleyrodes*)	5
anonae, Morg. (*g. Aleurodicus*)	9
asarumis, Shim. (*g. Aleurodicus*)	9
asparagi, Lew. (*g. Aleyrodes*)	5
asplenii, Mask. (*g. Aleyrodes*)	5
Asterochiton (subgenus), Cock.	4
aurantii, Mask. (*g. Aleyrodes*)	5
aureocincta, Ckll (*g. Aleyrodes*)	5
aureus, Mask. (*g. Aleyrodes*)	5
avellanae, Sign. (*g. Aleyrodes*)	5
bambusae, Peal (*g. Aleyrodes*)	5
banksiae, Mask. (*g. Aleyrodes*)	5
barodensis, Mask. (*g. Aleyrodes*)	5
bengalensis, Peal (*g. Aleyrodes*)	5
berbericola, Ckll (*g. Aleyrodes*)	5
bergii, Sign. (*g. Aleyrodes*)	5
brassicae, Walk. (*g. Aleyrodes*)	5
callophylli, Kot. (*g. Aleyrodes*)	5
capreae, Sign. (*g. Aleyrodes*)	5
carpini, Koch (*g. Aleyrodes*)	5
cerata, Mask. (*g. Aleyrodes*)	5
chelidonii, Latr. (*g. Aleyrodes*)	7
citri, Ril. & How. (*g. Aleyrodes*)	5
cockerelli, Iher. (*g. Aleyrodes*)	5
cockerelli, Quaint. (*g. Aleurodicus*)	9
cocois, Curt. (*g. Aleurodicus*)	9
comata, Mask. (*g. Aleyrodes*)	5
complanatum, Bärensprung (*g. Aleyrodes*)	5
coryli, Britt. (*g. Aleyrodes*)	5
coronata, Quaint. (*g. Aleyrodes*)	5
croceata, Mask. (*g. Aleyrodes*)	5
cotesii, Mask. (*g. Aleyrodes*)	5
decipiens, Mask. (*g. Aleyrodes*)	5
Dialeurodes (subgenus), Ckll	4
Dialeurodicus (subgenus), Ckll	8
diasemus, Bem. (*g. Aleyrodes*)	5
dorseyi, Kirk. (*g. Aleyrodes*)	5
dubia, Heeg. (*g. Aleyrodes*)	5
dugesii, Ckll (*g. Aleurodicus*)	9
erigerontis, Mask. (*g. Aleyrodes*)	5
errans, Bem. (*g. Aleyrodes*)	6
eugeniae, Mask. (*g. Aleyrodes*)	9
euphorbiae, Loew (*g. Aleyrodes*)	6
extraniens, Bem. (*g. Aleyrodes*)	6
fagi, Mask. (*g. Aleyrodes*)	6
fernaldi, Morr. (*g. Aleyrodes*)	6
fijiensis, Kot. (*g. Aleyrodes*)	6
filicium, Goeldi (*g. Aleyrodes*)	6

	Pages.
flocossa, Mask. (*g. Aleyrodes*)	6
floridensis, Quaint. (*g. Aleyrodes*)	6
fodiens, Mask. (*g. Aleyrodes*)	6
forbesii, Ashm. (*g. Aleyrodes*)	6
fragariae, Walk. (*g. Aleyrodes*)	6
fraxini, Sign. (*g. Aleyrodes*)	6
fumipennis, Hemp. (*g. Aleyrodes*)	6
gelatinosus, Ckll (*g. Aleyrodes*)	6
giffardi, Kot. (*g. Aleyrodes*)	6
glacialis, Bem. (*g. Aleyrodes*)	6
gossypii, Fitch (*g. Aleyrodes*)	6
goyabae, Goeldi (*g. Aleyrodes*)	6
graminicola, Quaint. (*g. Aleyrodes*)	6
hibisci, Kot. (*g. Aleyrodes*)	6
hirsuta, Mask. (*g. Aleyrodes*)	6
holmesii, Mask. (*g. Aleurodicus*)	9
horridus, Hemp. (*g. Aleyrodes*)	6
howardi, Quaint. (*g. Aleyrodes*)	6
hoyae, Peal (*g. Aleyrodes*)	6
hutchingsi, Bem. (*g. Aleyrodes*)	6
immaculata, Heeg. (*g. Aleyrodes*)	6
inconspicua, Quaint. (*g. Aleyrodes*)	6
interrogationis, Bem. (*g. Aleyrodes*)	6
iridescens, Bem. (*g. Aleyrodes*)	6
iridescens, Ckll (*g. Aleurodicus*)	9
jamaicensis, Ckll (*g. Aleurodicus*)	9
jelinekii, Frauenf. (*g. Aleyrodes*)	6
kelloggi, Bem. (*g. Aleyrodes*)	6
kirkaldyi, Kot. (*g. Aleyrodes*)	6
lacerdae, Sign. (*g. Aleyrodes*)	6
lactea, Zehnt. (*g. Aleyrodes*)	6
lauri, Sign. (*g. Aleyrodes*)	6
leakii, Peal (*g. Aleyrodes*)	6
lecanioides, Mask. (*g. Aleyrodes*)	6
limbata, Mask. (*g. Aleyrodes*)	6
longicornis, Zehnt. (*g. Aleyrodes*)	6
lonicerae, Walk. (*g. Aleyrodes*)	6
madroni, Bem. (*g. Aleyrodes*)	7
marlatti, Quaint. (*g. Aleyrodes*)	7
maskelli, Bem. (*g. Aleyrodes*)	7
melanops, Ckll (*g. Aleyrodes*)	7
merlini, Bem. (*g. Aleyrodes*)	7
minima, Quaint. (*g. Aleurodicus*)	9
mirabilis, Ckll (*g. Aleurodicus*)	9
mori, Quaint. (*g. Aleyrodes*)	7
mori arizonensis, Ckll (*g. Aleyrodes*)	7
mori maculata, Morr. (*g. Aleyrodes*)	7
morrilli, Britt. (*g. Aleyrodes*)	7
nephrolepidis, Quaint. (*g. Aleyrodes*)	7
nicotianae, Mask. (*g. Aleyrodes*)	7
niger, Mask. (*g. Aleyrodes*)	7
nigrans, Bem. (*g. Aleyrodes*)	7
nubilans, Buckt. (*g. Aleyrodes*)	7
ornatus, Ckll (*g. Aleurodicus*)	9
packardi, Morr. (*g. Aleyrodes*)	7
parvus, Hemp. (*g. Aleyrodes*)	7
pergandei, Quaint. (*g. Aleyrodes*)	7
perileuca, Ckll (*g. Aleyrodes*)	7
perseae, Quaint. (*g. Aleurodicus*)	9
phalaenoides, Blanch. (*g. Aleyrodes*)	7
phillyreae, Hal. (*g. Aleyrodes*)	7
plumosa, Quaint. (*g. Aleyrodes*)	7
piperis, Mask. (*g. Aleyrodes*)	7
prenanthis, Schrank (*g. Aleyrodes*)	7
proletella, Linné (*g. Aleyrodes*)	7
pruinosus, Bem. (*g. Aleyrodes*)	7
pulvinata, Mask. (*g. Aleurodicus*)	9
pyrolae, Gill. & Bak. (*g. Aleyrodes*)	7
quaintancei, Peal (*g. Aleyrodes*)	7
quercus, Sign. (*g. Aleyrodes*)	7
quercus-aquaticae, Quaint. (*g. Aleyrodes*)	7
religiosa, Peal (*g. Aleyrodes*)	7
ribium, Dougl. (*g. Aleyrodes*)	7
rolfsii, Quaint. (*g. Aleyrodes*)	7
rubi, Sign. (*g. Aleyrodes*)	7
rubicola, Dougl. (*g. Aleyrodes*)	7
ruborum, Ckll (*g. Aleyrodes*)	7
sacchari, Mask. (*g. Aleyrodes*)	7
simplex, Mask. (*g. Aleyrodes*)	7
simula, Peal (*g. Aleyrodes*)	7
sonchi, Kot. (*g. Aleyrodes*)	7
spinifera, Quaint. (*g. Aleyrodes*)	7
spiraeae, Doug. (*g. Aleyrodes*)	7
spiraeoides, Quaint. (*g. Aleyrodes*)	7
splendens, Bem. (*g. Aleyrodes*)	7
stanfordi, Bem. (*g. Aleurodes*)	7
stellata, Mask. (*g. Aleyrodes*)	7
struthanthi, Hemp. (*g. Aleyrodes*)	8
stypheliae, Mask. (*g. Aleyrodes*)	8
tabaci, Genn. (*g. Aleyrodes*)	8
tentaculatus, Bem. (*g. Aleyrodes*)	8
Tetraleurodes (subgenus), Ckll	4
tracheifer, Quaint. (*g. Aleyrodes*)	8
Trialeurodes (subgenus), Ckll	4
t-signata, Mask. (*g. Aleyrodes*)	8
vaccinii, Künow (*g. Aleyrodes*)	8
vaporariorum, Westw. (*g. Aleyrodes*)	8
variabilis, Quaint. (*g. Aleyrodes*)	8
vinsonioides, Ckll (*g. Aleyrodes*)	8
vitrinellus, Ckll (*g. Aleyrodes*)	8
vittata, Quaint. (*g. Aleyrodes*)	8
voeltzkowi, Newst. (*g. Aleyrodes*)	8
waldeni, Britt. (*g. Aleyrodes*)	8
wellmannae, Bem. (*g. Aleyrodes*)	8
xylostei, Westh. (*g. Aleyrodes*)	8
youngi, Hemp. (*g. Aleyrodes*)	8

EXPLANATION OF PLATES

Plate 1

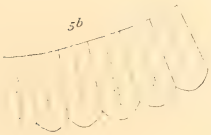
Fig. 1. *Aleyrodes mori*, Quaintance. Pupa case.
— 1*a*. *Aleyrodes mori*, Quaintance. Egg.
— 1*b*. *Aleyrodes mori*, Quaintance. Antenna of adult.
— 2. *Aleyrodes citri*, Riley & Howard. Pupa case.
— 3. *Aleyrodes citri*, Riley & Howard.
a) Showing general structure of pupa case;
b) Portion of cephalo-lateral margin with pore
c) Vasiform orifice.
— 4. *Aleyrodes abutilonea*, Haldeman. Pupa case.
— 5. *Aleyrodes abutilonea*, Haldeman. Pupa case
a) Showing general structure of pupa case.
b) Portion of caudo-lateral margin;
c) Vasiform orifice.

Plate 2

Fig. 6. *Aleyrodes abutilonea*, Haldeman. Adult female.
— 7. *Aleyrodes pergandei*, Quaintance. Pupa case, covered with white waxy secretion.
— 8. *Aleyrodes pruinosus*, Bemis. Adult male, showing general structural characters. (After Bemis.)
— 9. *Aleurochiton aceris*, Geoffroy. (After Tullgren.)
a) Wing venation;
b) Claw of adult;
c) Vasiform orifice adult ♀;
d) Vasiform orifice pupa case.
— 10. *Aleurodicus cocois*, Curtis. Group of pupae on leaf, showing copious white waxy secretion.
— 11. *Aleurodicus cocois*, Curtis. Structural details. (After Riley & Howard.)
a) Adult female;
b) Antenna of same;
c) Claw of same;
d et *e*) Abdomen of male showing genitalia;
f) Pupa case, dorsal view;
f') Compound pore of same;
g) Vasiform orifice, showing operculum, and large exserted lingula;
h) Margin of pupa case;
i) Pupa case, ventral aspect.

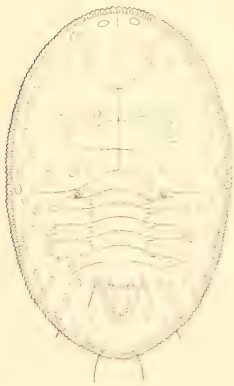
Washington, U. S. A., Sept. 15. 1908.

Aleyrodes abutilonea Haldeman.
(Pupa case)



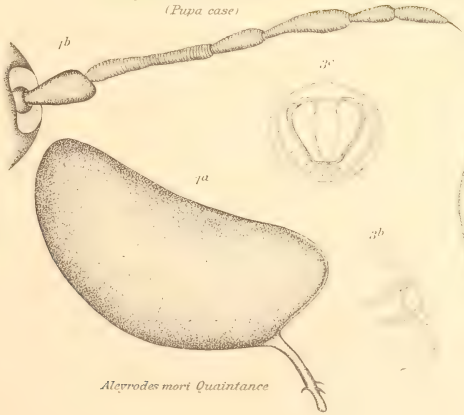
Aleyrodes mori Quaintance
(Pupa case)

Aleyrodes abutilonea Haldeman.
(Pupa case)



Aleyrodes abutilonea Haldeman

Aleyrodes citri Riley & Howard.
(Pupa case)



Aleyrodes mori Quaintance

Aleyrodes citri Riley & Howard.

FAM. ALEYRODIDÆ.

Aleurodicus cocois Curtis. ♀

Aleyrodes abutilonea Haldeman, Adult ♀

Aleurodicus cocois Curtis.
(*group of pupae*)

Aleyrodes pruinosus Bemis. ♂

Aleyrodes pergandei Quaintance.
(*pupa case covered with waxy secretion*)

FAM. ALEYRODIDÆ.

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